

## **IOWA HIGHWAY RESEARCH BOARD (IHRB)**

*Minutes of February 27, 2015*

### **Regular Board Members Present**

A. Abu-Hawash  
K. Jones  
M. Kennerly  
T. Nicholson  
S. Okerlund  
R. Knoche  
D. Schnoebelen  
W. Weiss

R. Stutt  
D. Miller  
P. Mouw  
K. Mayberry  
L. Roehl  
R. Fangmann  
T. Wipf

### **Alternate Board Members Present**

C. Poole

### **Members with No Representation**

None

### **Secretary – V. Goetz**

### **Visitors**

Steven Schrock  
Jacob Thorius  
Brian Gelder  
Zwng Hwankin  
Linda Narigon  
Francis Todey  
Dale Harrington  
Marian Muste  
Haowen Xu

University of Kansas  
Washington County  
Iowa State University  
Iowa State University  
Iowa Department of Transportation  
Iowa Department of Transportation  
CP Tech Center  
IIHR  
IIHR

The meeting was held at the Iowa Department of Transportation Ames Complex, Materials East/West Conference Room, on Friday, February 27, 2015. The meeting was called to order at 9:00 a.m. by Chairperson Terry Wipf with an initial number of 13 voting members/alternates at the table.

First order of business was to select a Vice-Chair for 2015 who will serve as board Chairperson in 2016.

Sarah Okerlund was nominated by Ron Knoche. Sarah accepted the role as vice-chair.

## **Agenda review/modification**

**\*\*\*1 member joined the table. Total voting members = 14**

### **Motion to approve Minutes from the December 11, 2104 meeting**

**Motion to Approve** by D. Schnoebelen; 2<sup>nd</sup> P. Mouw

Motion carried with 14 Aye, 0 Nay, 0 Abstaining.

**\*\*\*1 member joined the table. Total voting members = 15**

### **Business Plan Update, Meeting Dates, Board Membership**

Vanessa stated that last year we voted Iowa Research Board as the representative Statewide Transportation Innovation council for FHWA, the STIC, and adopted a resolution attachment D to the business plan.

We have new members on the Research Board for this year, Tammy Nicholson from the Office of Rail as a representative for the Iowa Department of Transportation, taking the place of Bob Younie. Mike Kennerly's new alternate is Chris Poole from Traffic and Safety Office, replacing David Little from IA DOT District 2. Sarah Okerlund was selected by APWA to serve another 3 year term as their representative. Paul Assman from Crawford County serving District 3 for the Counties is this year's ICEA President. Paul is going to switch for 1 year with Patrick Mouw, Dist. 3 alternate. Paul will return in 2016 to finish his board membership term. Russ Stutt from Jasper County in District 1 is our new regular member and Paul Geilenfeldt III from Marshall County is the new alternate. Kevin Mayberry from Mills County is staying on for another term representing the county District 4. The new alternate for Kevin Mayberry is Brad Skinner from Montgomery County.

We updated the meeting date's calendar; it is set for the next three years. The IHRB no longer meets in January and will meet in March instead.

**FINAL REPORT TR-626, "*Optimization of Snow Drifting Mitigation and control methods for Iowa conditions Part II*", George Constantinescu, The University of Iowa, (\$214,826)**

### **BACKGROUND**

Blowing and drifting of snow is a major concern for transportation efficiency and road safety in regions where their development is common. One common way to mitigate snow drift on roadways is to install plastic snow fences. Correct design of snow fences is critical for road safety and maintaining the roads open during winter in the US Midwest and other states affected by large snow events during the winter season and to maintain costs related to accumulation of snow on the roads and repair of roads to minimum levels. Of critical importance for road safety is the protection against snow drifting in regions with narrow rights of way, where standard fences cannot be deployed at the recommended distance from the road. Among the critical parameters

involved in fence design and assessment of their post-construction efficiency is the quantification of the snow accumulation at fence sites.

## **OBJECTIVES**

Monitor snow deposits around snow fences, quantitatively estimate snow deposits in the field, assess the efficiency and improve the design of snow fences. A related objective was to illustrate the capabilities of this methodology by applying it to improve the design of plastic snow fences that are commonly used by the IDOT. A second major objective was to propose, develop protocols and test a novel technique based on close range photogrammetry (CRP) to quantify the snow deposits trapped snow fences. A third objective was to attempt to estimate the snow relocation coefficient (SRC) based on readily available data and to make recommendations on how to accurately estimate this variable that needs to be provided to the standard snow fence design software used by IDOT.

## **DISCUSSION**

Q. In your simulations it looks like you assume that the gap was completely clear, however the installation photograph showed it had some grass and weeds in the gap it, it did look like the fence performed very well. Do you think it is absolutely necessary when the fences are installed that you would clear that area?

A. I would say that if we had a small gap it would not matter but if we have a large gap with lots of vegetation, the fence is not a snow fence any more it is just like an obstacle. So it is recommended to clear obstacles in all installations.

Q. Is the 30% gap fence cheaper than the 50% gap snow fence?

A. They are both similar

Q. Was the plastic fence backed with a metal fence?

A. Yes

## **IMPLEMENTATION**

Vanessa will visit with Brian Smith to discuss what the Department of Transportation and the County thought about the results of this study.

**Motion to Approve by W. Weiss; 2<sup>nd</sup> R. Fangmann**

Motion carried with 15 Aye, 0 Nay, 0 Abstaining.

**FINAL REPORT TR-631, “Automation of DEM Cutting for Hydrologic/Hydraulic Modeling”,**  
Brian Gelder, Iowa State University, (\$73,873)

## **BACKGROUND**

As a critical part of transportation design, hydrologic analysis helps ensure that roads are not frequently inundated and that hydraulic structures are able to accommodate the flow regimes they will likely see. LiDAR technology is now commonly used in hydrologic analysis to create high-resolution DEMs that help model the flow of water across a landscape.

However, such technologies introduce challenges that must be solved before these data can be commonly used as a model input. High-resolution DEMs capture many high-frequency manmade features and some natural features that create hydrologic obstructions during the hydrologic enforcement process. Moreover, some landform regions have significant amounts of natural depressions that are not handled well by traditional DEM enforcement.

## **OBJECTIVES**

Develop a method for hydrologic enforcement using digital elevation models (DEMs) created from raw light detection and ranging (LiDAR) data that both respects natural depressions and correctly enforces flow in areas that are drained.

## **DISCUSSION**

Q. On the stream stats it is probably not going to change it that much with the larger basins, do you have a sense of the size of the smaller basin that you are going to need to focus on? Where the LIDAR data tends to be pokier on the lobe?

A. The LIDAR issue is separate because counties had different subcontractor. The water shed areas we are looking at are 50 square miles or smaller.

## **IMPLEMENTATION**

The TAC recommendations from USGS was to put a proposal together to take these enforced elevation models and do some testing on 17 small water shed stream gages in the Des Moines lobe to determine if we can improve the aggression estimates. The proposal will be brought forth to the IHRB later this year.

**Motion to Approve by R. Knoche; 2<sup>nd</sup> D. Miller**

Motion carried with 15 Aye, 0 Nay, 0 Abstaining.

**FINAL REPORT TR-657, *“Evaluation of the Confirmation Light System at Signalized Intersections in Medium to Large Iowa Communities to Reduce Red Light Running Violations”*, Steve Schrock, Iowa State University, (\$70,000)**

## **BACKGROUND**

Vehicle crashes from red light running at signalized intersection continue to be a serious safety concern in the United States. The most recent national crash data indicates that 676 fatalities occurred due to red light running in 2009 which represents 10 percent of all intersection crashes and two percent of all roadway fatalities (FHWA, 2011). Communities across the US have responded to red light running through such countermeasures as targeted enforcement campaigns, intersection geometric and signal timing improvements, low-cost countermeasures and automated enforcement.

The Federal Highway Administration (FHWA) also reported that approximately half of the crashes in which a red light running was the primary cause in 2012 were not the driver of the vehicle, but rather were vehicle passengers, pedestrians, or bicyclists (NHTSA, 2013). Vehicles running a red light also have a significant economic impacts associated with every serious injury or fatality crash. The FHWA also reported in 2005 that the societal cost relating to red light running was approximately \$14 billion annually (FHWA, 2005.)

More specially to the State of Iowa, a study conducted by Fitzsimmons et al. (2007) for the Iowa Department of Transportation (Iowa DOT) indicated that based on Iowa crash data (2001 to 2006) that an average of 8,162 crashes occurred at signalized intersections and an average of 1,682 crashes were due to red light running. A follow up study conducted by Hallmark et al. (2012) for the Iowa DOT also indicated red light running continues to be a problem in Iowa with

6,007 crashes occurring at signalized intersections of which 1,525 crashes were due to red light running (based on 2010 data).

Due to the seriousness of red light running, considerable efforts have been undertaken by state highway agencies and local jurisdictions to explore and implement countermeasures to reduce red light running violations and associated crashes at busy signalized intersections.

### **OBJECTIVES**

The objective of this study was to investigate the effectiveness of a low-cost signalized intersection treatment to reduce RLR violations and ultimately crashes at signalized intersections. The research project targeted medium and large communities in Iowa in which a limited number of large intersections that handle a considerable amount of traffic. The research team selected confirmation lights as a way to aid police officers in more easily observing RLR violations when positioned downstream from the intersection. Confirmation lights have been deployed in many communities across the United States. However, limited effectiveness data has been published that can support the effectiveness of this device. The research team also selected to test the effectiveness of this device at two busy signalized intersections in Iowa, particularly Altoona and Waterloo.

Effectiveness of the confirmation lights were determined by a before-after violation study. The changes in violations were used as a safety surrogate for the potential changes in crashes. A secondary performance measure that was used included the changes of violation time into red which is an indicator of how far after the red signal did a vehicle violates the red light.

### **DISCUSSION**

Q. Did the Cameras and Students influence the behavior of the drivers?

A. The students were far enough away so I don't think it was an issue.

Q. Was the left turn the highest in running a red light wondering if by running analysis would make any difference or reductions?

A. We did run an analysis on left turns but did not find anything significant.

### **IMPLEMENTATION**

The study showed that installing the lights at intersections does not alter the behavior of running a red light one way or another and what does that mean for communities that are interested in putting a light in? Other studies that did show a reduction on running a red light, was this because law enforcement was using it as a tool? More information is needed on how effective the lights are used in combination with enforcement to reduce red-light running violations and crashes at signalized intersections.

There are a few grammatical errors that need to be cleaned up in the report. Additionally, a few of the sections need to be expanded to clarify some of the results and analysis. The discussion is that the board will approve the report on the condition that these issues are corrected before the report can be considered final.

**Motion to Conditionally Approve the final report by W. Weiss; 2<sup>nd</sup> R. Knoche**  
Motion carried with 15 Aye, 0 Nay, 0 Abstaining.

### **Topic Prioritization Voting**

Every member is given 20 votes and can have up to 4 votes on any one topic. Topics were prioritized based on final votes and the 2016 program will be developed based on this topic ranking.

### **Funds for Innovative Project RFP**

Vanessa explained that IHRB used to do innovative proposals; these types of proposals are research ideas that might have an impact but carry a higher risk. We provided seed money for these type of new and innovative ideas. The last 4 years we have not had the additional funding left over. In 2008 the board approved a project TR-480, looking at the long term effect on salt on Portland cement concrete, this was part of a pooled fund project being led by Nebraska. The board approved 80,000 dollars and due to an omission, the funds were not committed on the pooled fund website. Vanessa proposes that we put the 80,000 back into seed money for any innovative proposals.

**Motion to Approve by W. Weiss; 2<sup>nd</sup> R. Knoche**

Motion carried with 15 Aye, 0 Nay, 0 Abstaining.

### **NEW BUSINESS**

The board is sponsoring two county representatives to go to the low volume road conference in Pittsburgh. A request was made to have IHRB cover for the registration for additional County Engineers to go to this conference. Wade Weiss will investigate if there is interest from other counties and table this proposal until the March meeting.

### **ADJOURN**

**The next meeting of the Iowa Highway Research Board will be held Friday, March 27, 2015, in the East/West Materials Conference Room at the Iowa DOT. The meeting will begin promptly at 9 a.m.**



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**Vanessa Goetz, IHRB Secretary**